REMARKS

Favorable reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

I. CLAIM STATUS & AMENDMENTS

Claims 5-20 are pending in this application, and stand rejected.

The present amendment amends claims 5-10 and 12-20. Applicants reserve the right to file a continuation or a divisional application on any cancelled subject matter.

Claims 5-7 and 12-20 were amended to better conform with U.S. patent practice regarding method claims. These editorial amendments are directed only to matters of form, and are not intended to restrict the scope of the claims. Support for these changes can be found in the claims as originally filed, and throughout the Specification.

For instance, support for the term "controlling the concentration of oxygen" in claims 5 and 16 can be found in the original claims and in the Specification, for example, at page 58, lines 7-24.

Support for the term "element" in claims 6 and 7 can be found in original claims 6 and 7.

Support for the term "locations" in claim 12 can be found in original claim 12.

Support for the elements added to claims 8 and 9 can be found in original claim 7. These claims were also amended to provide proper antecedent support for the "pores" and "surface areas" of the catalyst. Support this language can be found in the claims as originally filed and in the Specification, for example, at page 19, lines 20-29.

Support for the ratio of oxygen in the oxygen containing gas to the oxygen demand of the waste water in claim 10 can be found in original claim 10 and in the Specification, for example, at page 39, lines 15-20.

Support for the ratio of oxygen in the oxygen containing gas to the oxygen demand in the protection liquid in claims 17 and 20 can be found in the claims as originally filed and in the Specification, for example, at page 59, lines 17-24.

Therefore, no new matter has been added by this amendment.

II. REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claims 6, 7, 12-17, 19, and 20 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being vague and indefinite. See Office Action, page 2.

Applicants respectfully traverse this rejection as applied to the amended claims for the following reasons.

Claims 6 and 7 have been amended to recite "one element" as suggested by the Examiner.

Claim 12 has been amended to recite "location" as suggested by the Examiner.

Claims 10, 17, and 20 have been amended to better clarify the stated ratios, thereby obviating the Examiner's concerns regarding this language.

Claims 13-16, 18, and 19 have been amended to better clarify the method steps of the invention, thereby obviating the Examiner's concerns regarding the recitations "when starting up", "when suspending" and "so as...remained."

In view of the above, the rejection of claims 6, 7, 12-17, 19, and 20 under 35 U.S.C. § 112, second paragraph, is untenable and should be withdrawn.

III. REJECTIONS UNDER 35 U.S.C. § 103

A. Yan in view of McBrayer

Claims 5-12 are rejected under 35 U.S.C. 103(a) as allegedly obvious over Yan, U.S. Patent No. 5,552,063, in view of McBrayer et al., U.S. Patent No. 5,720,889. See Office Action, pages 2-3.

Applicants respectfully traverse this rejection as applied to the amended claims for the following reasons.

Yan and McBrayer fail to render obvious the claimed invention because: (1) there is no suggestion and/or motivation to combine the reference teachings, because the references teach away from their combination; (2) even if Yan and McBrayer were to be combined, their

combination would render the prior art invention unsatisfactory for its intended purpose; and (3) the references fail to teach and/or suggest each and every element of the claimed invention.

It is well established that the prior art must contain a suggestion to combine/modify the reference teachings to arrive at the claimed invention. Also, the prior art must be considered in its entirety, and references cannot be combined where the references teach away from their combination. Furthermore, if a modification would render the prior art invention unsatisfactory for its intended purpose, there is no suggestion or motivation to make the proposed modification.

In this case, Yan teaches the treatment of waste water containing phenol by directing a source of oxygen and a waste water over a catalyst at a temperature of from about 80°C to about 145°C and a pressure of from about 10 to about 500 psi.

On the other hand, McBrayer relates to methods for treating waste water streams at a range of temperatures and pressures in the vicinity of supercritical water conditions (see column 1, lines 13-15 of McBrayer). In other words, the method in McBrayer involves organic matter under supercritical conditions in the presence of an oxidant without a catalyst (see column 1, line 65 of McBrayer). Accordingly, the temperature and pressure of the method of McBrayer is much higher, 705°F (about 374°C) and about 3200 psi (about 3185 psi), than those of Yan (see column 9, line 44 of McBrayer). The objective in McBrayer is to alleviate problems and control the reactant concentration and temperature by considerably improving the output of reaction chambers operating in the vicinity of supercritical water conditions. See McBrayer, column 3, line 4. However, under supercritical water conditions, water is not both a liquid and a gas. This conflicts with the teaching in Yan. Yan clearly discloses treating liquid waste water. In this regard, Yan teaches away from the supercritical conditions of McBrayer. Accordingly, Yan cannot be combined with McBrayer.

Nonetheless, even if Yan and McBrayer were to be combined, the temperature would have to be raised by about 374°C to solve the objective of McBrayer. However, by raising the temperature, the activated carbon in the catalyst is liable to be brought into combustion, which would eliminate the desired effect in McBrayer. As discussed in the Specification, activated

carbon is liable to be brought into combustion under the conventional wet oxidation procedures. In this sense, McBrayer cannot be combined with Yan, because the modification would render the prior art invention unsatisfactory for its intended purpose. Consequently, there is no suggestion or motivation to make the proposed modification to arrive at the claimed invention.

Furthermore, Yan needs about 1.5 to about 5 mole of O_2 per mole of chemical oxygen demand. This value is about 7 to 16.8% in terms of O_2 concentration. However, as disclosed at page 4, line 3 to page 5, line 16 in the background section of the Specification, under conditions of high O_2 concentration, catalytic activity deteriorates within a short time, thus rendering the catalyst less enduring, unstable and unworkable. Yan and McBrayer suffer from these problems found in the prior art problems as discussed in the background section of the Specification.

On the other hand, the present invention solves these problems. The present invention provides for a method of treating waste water efficiently for a long period of time in a stable manner by wet oxidation using a catalyst containing activated carbon at a low temperature and under low pressure. Specification, page 9, lines 6-15. The present invention suppresses the deterioration of the catalyst. The present invention also provides for a method of efficiently recovering the activity of the catalyst containing activated carbon.

In addition, Yan and McBrayer also fail to render the claimed invention obvious, because they fail to teach each and every element of the claimed invention. Specifically, they fail to teach and/or suggest the specific pore volume of the catalyst in claim 8. The specific pore volume is important, because, if the specific pore volume having pore diameter in the range from 0.1 to 10 μm is less than 0.1 ml/g, oxygen and the oxidizable substances are hard to diffuse into the catalyst, resulting in the deterioration of the adsorption of the oxidizable substances to the active site of the catalyst. This further results in deteriorating the usability of oxygen for decomposing oxidizable substances, and the excess oxygen may cause the activated carbon itself to be combusted. On the other hand, if the specific pore volume having pore diameter in the range from 0.1 to 10 μm exceeds 0.8 ml/g, the catalyst may suffer a decrease in mechanical strength. McBrayer and Yan fail to teach and/or suggest these aspects of the claimed invention.

Also, Yan and McBrayer fail to teach and/or suggest the specific surface area of the catalyst of claim 9. If the decrease value of the specific surface area is less than 50 m^2/g, the pore portion of the activated carbon may be inefficiently covered by the component, whereby the catalyst may suffer a decrease in catalytic activity and durability. Similarly, if the decrease value of the specific surface area exceeds 800 m^2/g, the pore portion of the activated carbon (which facilitates the oxidation/decomposition) may be covered by the component, and the catalyst may suffer a decrease in catalytic activity. This effect was not contemplated by the prior art. It is not obvious based on what was known in the art. The specific surface area of the catalyst as defined in the claim 9, and as described in the catalysts prepared in the catalyst preparations 1 to 8 in the Specification, solves this problem. By contrast, Yan and McBrayer simply fail to teach and/or suggest this aspect of the claimed invention.

In view of the above, Yan and McBrayer fail to render the claimed invention obvious, because the reference teachings cannot be combined; they lack a suggestion to modify the reference teachings to arrive at the claimed invention; and they fail to teach each and every element of the claimed invention.

Therefore, the rejection of claims 5-12 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

B. Yan in view of Maeda or Moritake

Claims 13-15 and 17-20 stand rejected under 35 U.S.C. § 103(a) as allegedly obvious over Yan, in view of Maeda et al., JP9010602 or Moritake et al., JP58114733. See Office Action, page 3.

Applicants respectfully traverse this rejection as applied to the amended claims for the following reasons. The deficiencies of Yan are discussed above, and are herein reiterated.

Yan, Maeda, and Moritake fail to render obvious the claimed invention, because they fail to teach and/or suggest each and every element of the claimed invention.

In view of the above, the rejection of claims 13-15 and 17-20 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

C. Yan in view of Maeda or Moritake, further in view of McBrayer

Claim 16 stands rejected under 35 U.S.C. § 103(a) as allegedly obvious over Yan, in view of Maeda or Moritake, and further in view of McBrayer. See Office Action, pages 3-4.

Applicants respectfully traverse this rejection as applied to the amended claims for the same reasons given above with regard to Yan, Maeda, Moritake and McBrayer.

In view of the above arguments, the rejection of claim 16 under 35 U.S.C. 103(a) is untenable and should be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, the present application is now in condition for allowance and early notice to that effect is hereby requested.

If it is determined that the application is not in condition for allowance, the Examiner is invited to telephone the undersigned attorney at the number below to expedite prosecution of the present application.

Respectfully submitted,

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEES FOR THIS PAPER TO DEPOSIT ACCOUNT NO. 23-0975

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